Tool 6
Model Scopes

This tool provides two example scopes-of-work to develop a watershed restoration or protection plan

Model Scope of Work
False Creek Watershed Restoration Plan

Background Information

Presented below is a model scope of work to develop a watershed restoration plan for the False Creek Watershed in Phantom County, Maryland. The 28 square mile watershed contains over 62 miles of perennial streams and has been delineated into 6 subwatersheds. The City of Bogusville, a Phase II community, is located in the lower portion of the watershed. A portion of the mainstem below Bogusville is 303(d) listed for sediment and nutrients. About ¾ of the watershed is built-out and consists of urban and suburban development, with the remainder in agriculture and forest in the upper reaches of the watershed. The City of Bogusville has developed this scope of work as part of a grant application submitted to a state-funded program for watershed planning. The City's Stormwater Management Division will be responsible for conducting the assessments and developing the plan. A baseline assessment of the watershed completed by this Division under a previous grant will provide much of the background data for use in developing the restoration plan.

Note to User's Guide Readers:
This model scope of work is based on the following assumptions:

- All of the methods outlined in Getting Started (Chapter 3) have already been completed.
- Establishing a Baseline (Chapter 4) has been completed under a previous grant.
- Classifying and Ranking Subwatersheds has been skipped because it was determined that the grant amount would allow the City to conduct stream and upland assessments of the entire watershed. The City of Bogusville made the decision to focus stormwater retrofit efforts in the Example Run subwatershed because uncontrolled runoff from the City is causing flooding problems in the immediate area and contributing to high sediment and nutrient loading downstream, where a portion of the mainstem is on the 303(d) list.
- Project budget only includes level of effort, not actual dollar amounts as these will vary for every jurisdiction depending on staff salary and benefit amounts, how/if volunteers are utilized, travel reimbursement policies, and any associated indirect costs.

WORKPLAN

Project Title: False Creek Watershed Restoration Plan

Detailed Description of Project:

Goals and Objectives

The overall objective of this project is to develop a watershed restoration plan for the False Creek Watershed, located in Phantom County in western Maryland. The restoration plan will incorporate watershed goals, findings from stream and upland assessments, and specific recommendations for protection and restoration projects, as well as code and programmatic changes. A major goal of the restoration plan is to reduce sediment and nutrient loads in the watershed, and ultimately have streams removed from the 303 (d) list.

Methodology and Approach

The methodology and approach proposed for this project includes six tasks that are described below.

Task 1. Develop Watershed Restoration Goals

Under this task, the City of Bogusville will define clear and measurable goals and objectives to guide the restoration process, and select indicators that will be used to measure progress towards them. A major source of data for setting watershed goals is the False Creek Watershed Baseline Report produced in 2004 by the City of Bogusville. This report summarizes existing watershed data (e.g., land use, historic and current monitoring data, demographics), and defines key problems and impairments in the watershed. Subtasks associated with developing watershed restoration goals are:

1.1 Watershed Needs and Capabilities Assessment: Conduct a review of local restoration capacity and needs, including regulatory drivers for restoration, technical resources, restoration partners, and key stakeholders. The Needs and Capabilities Assessment will be used for this review, and is provided as Attachment A.

1.2 Conduct Stakeholder Education Meetings: Facilitate up to two stakeholder meetings to solicit stakeholder involvement in watershed issues and obtain consensus on goals and objectives that guide watershed restoration.

Task 2. Identify Restoration Opportunities

Under this task, the City of Bogusville will conduct stream and upland assessments to identify restoration opportunities in the watershed.

2.1 Conduct Stream Assessment: Five field crews (2 staff for each field crew) will assess the perennial streams in the watershed using the Stream Corridor Assessment (SCA) protocol (Attachment B) for five days. Specific restoration opportunities will be identified, including impacted buffers and stream erosion.

2.2 Conduct Upland Assessment: Field crews will also visit and evaluate residential neighborhoods and potential hotspots in the watershed using the Unified Site and Subwatershed Reconnaissance (USSR) protocol (Attachment C). Specific restoration opportunities will be identified, including stormwater outfalls and upland pollution sources. The City of Bogusville will use the Phantom County parcel data to identify and contact key landowners to obtain permission to access their property prior to conducting field work.

Task 3. Conduct Detailed Restoration Assessments

Under this task, the City of Bogusville will utilize a subcontractor evaluate stormwater retrofit potential in the Example Run subwatershed. This subwatershed contains the City of Bogusville and is subject to frequent flooding from uncontrolled stormwater runoff. This subwatershed was chosen as an area of focus because of the immediate flooding problems, and because this runoff was identified as a major contributor to the downstream sediment and nutrient concentrations that have placed a portion of the mainstem on the 303(d) list. The City of Bogusville will use the Retrofit Reconnaissance Inventory (RRI) protocol (Attachment D) to identify and develop concept designs for up to seven potential storage and on-site retrofit opportunities. Prior to conducting the inventory, field crews will identify potential retrofit sites based on land use and storm drain mapping and STPs, and will obtain landowner permission before accessing private property.

Task 4. Develop Watershed Restoration Recommendations

Under this task, the City of Bogusville will develop watershed restoration recommendations for the False Creek Watershed. Watershed restoration recommendations are the most important element of a watershed restoration plan, and generally consist of two parts: 1) protection and restoration projects, and 2) regulatory and programmatic changes. Protection and restoration projects refer to a suite of site-specific projects that either conserves existing watershed resources or corrects specific problems identified through stream and upland assessments. Regulatory and programmatic recommendations are designed to protect watershed resources from future development impacts, and are developed in direct response to a review of local codes, ordinances, and programs related to watershed protection. Where local regulations and programs are found lacking, specific changes are recommended. Subtasks associated with developing watershed restoration recommendations are:

4.1 Inventory of Potential Projects: Compile data from field assessments to identify the full suite of potential projects.

4.2 Neighborhood Consultation Meetings: Conduct neighborhood consultation with all major landowners and HOAs affected by the proposed restoration projects to get feedback on the proposed projects. Neighborhood consultation can take the form of public meetings or forums, or one-on-one meetings and field trips.

4.3 Rank Projects: Develop a ranking system and rank individual projects based on factors such as pollutant reduction, cost, feasibility, and public acceptance. The ranking system used will reflect overall watershed goals and stakeholder preferences and allow a direct and fair comparison among all proposed projects in the watershed.

4.4 Evaluate Local Programs and Regulations: Conduct an audit of local watershed programs and regulations. The purpose of the audit is to identify specific areas of existing regulations and programs that could be improved to provide better watershed protection. The 8 Tools Audit (Attachment E) will be used for this subtask. Develop recommendations for changes to local regulations and programs based on the results of the 8 Tools Audit and stakeholder input.

Task 5. Determine if Recommendations Meet Watershed Restoration Goals

Under this task, the City of Bogusville will analyze the ability of the proposed protection and restoration projects to meet the watershed restoration goals and objectives defined in Task 1. The primary method used to accomplish this task is the Watershed Treatment Model, a simple spreadsheet model that estimates flow or pollutant reduction associated with implementation of specific restoration projects across an entire watershed or subwatershed. A brief summary of the WTM is provided as Attachment F. The project ranking and recommendations will be revised based on findings from the WTM, if necessary.

Task 6. Develop Watershed Restoration Plan

Under this task, the City of Bogusville will draft a 20 to 30 page restoration plan for the False Creek Watershed that incorporates watershed restoration goals and recommendations made under Tasks 1 and 4, as well as a plan for monitoring restoration success based on indicators identified under Task 1. The recommendations section will include project ranking and priority projects, watershed maps, and regulatory and programmatic recommendations. The restoration plan will also include a proposed schedule and guidance for implementation of all priority projects, including estimated

costs, conceptual designs, responsible parties and project partners, funding strategies, and a construction and maintenance schedule. Subtasks associated with developing watershed restoration plan are:

6.1 Draft Watershed Plan: Develop draft watershed restoration plan and submit to funders, major State agencies and Phantom County for review.

6.2 Hold Final Stakeholder Meeting: Present the draft plan at a local public meeting to solicit final comments from stakeholders.

6.3 Finalize the Plan: Revise the draft plan based on public comment and submitted to the Board of Supervisors for adoption. The City of Bogusville will also submit to the Board of Supervisors a request for funding to implement priority projects recommended for the first year.

Project Schedule and Deliverables

Five deliverables are anticipated under this project. These are listed below along with the proposed schedule for completion.

Project Schedule and Deliverables		
Task	**Deliverable**	**Schedule**
1	Completed Needs and Capabilities Assessment	Month 1
	Memo summarizing watershed restoration goals, objectives and indicators	Month 2
2	Memo summarizing results of stream and upland assessments, to include summary tables and maps of proposed projects	Month 4
3	Memo summarizing results of stormwater retrofit inventory, to include summary tables and project concept designs	Month 5
4	Completed 8 Tools Audit	Month 6
	Memo summarizing draft watershed restoration recommendations, project ranking system, and neighborhood consultation methods	Month 6
5	Memo summarizing results of the WTM	Month 8
6	Draft watershed restoration plan	Month 10
	Final watershed restoration plan and funding proposal for implementation of first year projects	Month 12

Project Budget

The table provided below proposes the level of effort in staff hours for each task.

Proposed Level of Effort	
Task	**Effort (hours)**
1. Develop Watershed Restoration Goals	
1.1 Watershed Needs and Capabilities Assessment	100
1.2 Hold Stakeholder Education Meetings	80
2. Identify Restoration Opportunities*	
2.1 Conduct Stream Assessment	484
2.2 Conduct Upland Assessment	168
3. Conduct Detailed Restoration Assessments*	88

Proposed Level of Effort	
Task	**Effort (hours)**
4. Develop Watershed Restoration Recommendations	
4.1 Inventory of Potential Projects	40
4.2 Hold Neighborhood Consultation Meetings	40
4.3 Rank Projects	40
4.4 Evaluate Local Programs and Regulations	100
5. Determine if Recommendations Meet Restoration Goals	120
6. Develop Watershed Restoration Plan	
6.1 Draft Watershed Plan	120
6.2 Hold Stakeholder Meeting	40
6.3 Finalize the Plan	40
* Hours include pre and post processing	

Project Partners

The City of Bogusville has identified several key partners for implementing this scope of work. The Friends of False Creek will provide assistance in coordinating stakeholder meetings and will also recruit volunteers to assist with the stream and upland assessments. A subcontractor, FloodTech, Inc., will conduct the stormwater retrofit inventory and use the WTM to evaluate pollutant reductions. Qualifications for FloodTech, Inc are provided as Attachment H. Finally, the City of Bogusville will work closely with the Maryland DNR, who funded the False Creek Watershed Baseline Report, to solicit feedback on the plan recommendations and implementation schedule.

Next Steps

Watershed restoration planning does not end with the completion of the plan itself. The next steps are to actually implement the plan recommendations according to the schedule outlined in the plan. The City of Bogusville will solicit local funding for implementation of priority projects recommended for the first year of implementation. Additional funding sources, such as Maryland DNR, EPA, and Chesapeake Bay Program will be pursued for implementation of additional projects with project partners identified in the watershed restoration plan. The City of Bogusville will track and evaluate both plan implementation and restoration success by keeping an up-to date inventory of project implementation status and by conducting the long-term monitoring outlined in the watershed restoration plan.

Trout Creek Watershed Plan
Model Scope of Work

Submitted by:
Watershed Consultants, Inc.

The Watershed Consultants, Inc. (WCI) is pleased to provide this proposal for technical services related to the development of a watershed plan for the Trout Creek watershed located in the coastal plain portion of Brook County, MD. This is considered to be the first phase of two phases to develop a comprehensive watershed plan for the Trout Creek Watershed.

Background Information

The Trout Creek watershed is approximately 90 square miles watershed that contains nine subwatersheds and approximately 190 perennial stream miles. The lower half of the watershed is primarily dominated by agriculture (mostly active pastureland) while the upper watershed is a mixture of low to medium density residential development. Additional development in the headwater subwatersheds is anticipated in the near future. The Trout Creek watershed ultimately drains to the Blue Crab River in the southern half of Brook County.

Important natural and historical resources exist in the watershed. While the headwater streams in Trout Creek have not been extensively studied, they lead to tidal areas that have high fish diversity and are estimated to be important nursery grounds for many species of fish and other estuarine organisms. Thus, maintaining the diversity of the aquatic community may be a prime objective of the plan. Preventing sediment deposition in downstream tidal wetlands is also a primary goal, as significant channel erosion and construction has occurred due to some uncontrolled upstream development and rural impacts.

Note to Users Guide Readers:
This model scope of work is based on the following assumptions:

- All of the methods outlined in Getting Started (Chapter 3) have already been completed by the County.
- Steps do not exactly follow those outlined in the Users Guide but have been adapted and modified to fit the characteristics of the watershed and requirements of the plan.
- The County does not have enough staff to complete the watershed plan themselves.
- The amount of funding currently available is not enough to complete detailed assessments in all the subwatersheds.
- Additional funding will be available again in Year 2.
- Project budget only includes level of effort, not actual dollar amounts as these will vary for every jurisdiction depending on staff salary and benefit amounts, how/if volunteers are utilized, travel reimbursement policies, and any associated indirect costs.

Methodology and Approach

The full watershed plan will be done in two phases to accommodate funding availability. The tasks and subtasks outlined below are associated with the first phase of this project. The first phase will encompass a contiguous forest assessment; review data and studies; codes, ordinances and programs at the watershed scale. Field work and other detailed project investigations will be focused on four priority subwatersheds that will be determined through a screening process. The watershed plan

developed as a result of this first phase will separate and identify recommendations that require immediate attention and implementation.

The second phase of the plan will be completed once additional funding sources become available and will include the completed field work and set of recommendations for the remaining five subwatersheds. Detailed project investigations conducted under the second phase may include a stream repair inventory (SRI) and a pasture assessment for water resource protection.

Task 1: Develop Watershed Planning Goals

1.1 Kick-off Meeting: WCI will meet with Core Team to kick-off the project in Month 1. At a minimum the core team will consist of representatives from the County Department of Public Works, County Department of Planning, County Health Department, Friends of Trout Creek, Brook County Land Trust, Brook County Soil Conservation District, Maryland Department of Natural Resources (MD DNR), Forest Service and WCI. During the kick-off meeting the core team will put together a preliminary stakeholder list, discuss future stakeholder involvement, determine broad goals for watershed plan and discuss potential factors for Task 2. The County will provide WCI with any existing data and studies related to the Trout Creek watershed.

1.2 Establish a Baseline: Utilizing the existing data and studies, WCI will summarize watershed conditions, conduct an impervious cover analysis, summarize monitoring data and conduct a sensitive areas analysis. The Baseline Report will include an emphasis on potential sources of sediment to downstream tidal wetlands. Copies of the report will be distributed to the core team.

1.3 Recruit Stakeholders: Based on the list put together by the Core Team, WCI will complete a contact database, determine best format for contacting stakeholders and meetings.

Product(s): Baseline Report, Preliminary Subwatershed Management Classifications, Draft Watershed Goals

Task 2: Classify and Screen Priority Subwatersheds

2.1 Educate Stakeholders: The first meeting will provide stakeholders with a basic understanding of watershed planning, share the results of the baseline report using maps and picture heavy power point presentation, and get preliminary input from stakeholders on draft goals and potential classification and ranking factors (see Subtask 2.2).

2.2 Classify and Rank Subwatersheds: Predicting that most subwatersheds will be classified as "Sensitive" (under 10% impervious cover), WCI will take a closer look at other factors gathered during Baseline Report to determine which subwatersheds are the most vulnerable to future development and rurally impacted.

2.3 Identify Priority Subwatersheds: WCI will work with the Core Team to identify an appropriate process for identifying up to four subwatersheds where field assessments will be conducted first. WCI will encourage an emphasis on the headwater subwatersheds to target the uncontrolled stormwater runoff.

Product(s): Screening Factors, Revised Subwatershed Management Classifications, and Priority Subwatersheds

Task 3: Identify Watershed Planning Opportunities

3.1 Evaluate Watershed Programs and Regulations: Under this subtask, WCI will conduct an in-depth review of the County's codes, ordinances and programs in the context of the eight tools of watershed protection (Land Use Planning, Land Conservation, Aquatic Buffers, Better Site Design, Erosion and Sediment Control, Stormwater Management, Non-stormwater Discharges, and Watershed Stewardship).

3.2 Conduct Stream Assessment: WCI will conduct MD DNR's Stream Corridor Assessment (SCA) survey in the four priority subwatersheds. The SCA is a continuous stream walking method that will be used to systematically assess the range of impacts and potential protection and restoration projects found along the stream corridor. WCI will encourage key stakeholders and the core team to join them in the field. Additionally, the survey will also be used to identify and refine the extent of perennial streams in the County since a stream GIS layer is only available from the State. WCI take five teams of two staff in the field for five days.

Product(s): Program and Regulations Review Memo, Field Assessment Sheets, Map Showing Sites with Corresponding Table, Revised Perennial Stream GIS Layer

Task 4: Conduct Detailed Assessments

4.1 Conduct Contiguous Forest Assessment: WCI will conduct a contiguous forest inventory for the Trout Creek watershed to evaluate the contiguousness and quality of each forest tract that meets MD DNR's criteria for Forest Interior Dwelling Species (FIDS) habitat. This data will be used to prioritize contiguous forest tracts for conservation.

4.2 Conduct Retrofit Reconnaissance Inventory (RRI): An inventory will be conducted in the four priority subwatershed to identify candidate retrofits projects where stormwater treatment previously does not exist. The inventory will be used to identify and develop concept designs for up to seven potential storage and on-site retrofit opportunities.

4.3 Hold Neighborhood Consultation Meeting(s): WCI will hold up to two consultation meetings with landowners to discuss the feasibility of adjacent stormwater retrofit projects. Stakeholder input from this meeting will be factored into the overall prioritization of the retrofit candidate projects.

Product(s): Completed Field Sheets, Field Maps Showing Contiguous Forest Tracts, Stormwater Retrofit Concept Designs, Summary of Consultation Meeting(s)

Task 5: Assemble Recommendations into Plan

5.1 Compile and Rank Recommendations: WCI will meet with core team to compile and rank recommendations. Recommendations may be ranked according to pollutant reduction, cost, feasibility, public acceptance and other key implementation factors. Emphasis will be placed on early action recommendations in the four priority subwatersheds.

5.2 Draft Watershed Plan: WCI will summarize existing conditions and potential opportunities identified during field work, make priority recommendations, and include maps showing the locations of proposed projects. The plan will also include an implementation planning table that will identify the objective, responsible party, measurable indicator, public involvement,

programmatic change, estimated cost and potential funding source and implementation timeframe for each recommendation.

Product(s): Draft Watershed Plan

Task 6: Determine if Watershed Plan Meets Goals

6.1 Estimate Pollutant Loads and Reductions: WCI will incorporate priority recommendations into the Watershed Treatment Model to show the relationship of pollutant loads before and after implementation. Results from the WTM will be incorporated into the Draft Plan.

6.2 Incorporate External Plan Review: WCI will submit the draft plan to the core team and key state agencies for review. WCI will also present the priority recommendations to the larger stakeholder group and engage them in an activity to gauge overall stakeholder support for the report and individual recommendations.

6.3 Finalize Watershed Goals, Objectives and Indicators: WCI will formally finalize watershed goals, objectives and indicators now that appropriate feedback and data have been taken into account. WCI will also check the watershed plan against the goals of any other relevant regulatory drivers to ensure that they align.

Product(s): WTM Results Summary Table

Task 7: Methods to Implement Plan

7.1 Plan for Indicator Monitoring: With core team input, WCI will map out a plan for measuring success through indictor monitoring. WCI and the core team will identify the appropriate indicators and existing monitoring stations to tie into.

7.2 Adopt the Final Plan and Determine an Implementation Strategy: WCI will finalize the watershed plan. WCI with the core team will also identify a strategy to get the watershed plan adopted, funded and implemented over time. Emphasis will be placed on implementing early-action recommendations identified in the four priority subwatersheds.

Product(s): Final Watershed Plan, Implementation and Monitoring Plan Summary Memo

Schedule

A proposed scheduled for completing Phase I of the Trout Creek Watershed Plan is shown in Table 1.

Table 1. Proposed Schedule for Phase I of the Trout Creek Watershed Plan	
Task	**Schedule**
1: Develop Watershed Planning Goals 1.1 Hold Kick-off Meeting 1.2 Establish a Baseline 1.3 Recruit Stakeholders	Months 1 – 3
2: Classify and Screen Priority Subwatersheds 2.1 Educate Stakeholders 2.2 Classify and Rank Subwatersheds 2.3 Identify Priority Subwatersheds	Months 3 – 6
3: Identify Watershed Planning Opportunities 3.1 Evaluate Watershed Programs and Regulations 3.2 Conduct Stream Assessment	Months 7 – 8
4: Conduct Detailed Assessments 4.1 Conduct Contiguous Forest Assessment 4.2 Conduct Retrofit Reconnaissance Inventory 4.3 Hold Neighborhood Consultation Meetings	Months 8 – 9
5: Assemble Recommendations into Plan 5.1 Compile and Rank Recommendations 5.2 Draft Watershed Plan	Month 10
6: Determine if Watershed Plan Meets Goals 6.1 Estimate Pollutant Loads and Reductions 6.2 Incorporate External Plan Review 6.3 Finalize Watershed Goals, Objectives and Indicators	Month 11
7: Methods to Implement Plan 7.1 Plan for Indicator Monitoring 7.2 Adopt the Final Plan	Month 12

Project Budget

Table 2 provided below proposes the level of effort in staff hours for each task.

Table 2. Proposed Level of Effort	
Task	**Schedule**
1: Develop Watershed Planning Goals 1.1 Hold Kick-off Meeting 1.2 Establish a Baseline 1.3 Recruit Stakeholders	 40 360 16
2: Classify and Screen Priority Subwatersheds 2.4 Educate Stakeholders 2.5 Classify and Rank Subwatersheds 2.6 Identify Priority Subwatersheds	 40 120 80
3: Identify Watershed Planning Opportunities 3.3 Evaluate Watershed Programs and Regulations 3.4 Conduct Stream Assessment	 100 484
4: Conduct Detailed Assessments 4.4 Conduct Contiguous Forest Assessment 4.5 Conduct Retrofit Reconnaissance Inventory 4.6 Hold Neighborhood Consultation Meetings	 64 88 80

Table 2. Proposed Level of Effort	
Task	**Schedule**
5: Assemble Recommendations into Plan	
5.3 Compile and Rank Recommendations	40
5.4 Draft Watershed Plan	120
6: Determine if Watershed Plan Meets Goals	
6.4 Estimate Pollutant Loads and Reductions	120
6.5 Incorporate External Plan Review	80
6.6 Finalize Watershed Goals, Objectives and Indicators	8
7: Methods to Implement Plan	
7.3 Plan for Indicator Monitoring	24
7.4 Adopt the Final Plan	24
*Hours include pre and post processing	